

**PART 1      GENERAL**

**1.1      RELATED SECTIONS**

- .1      Section 03 20 00 – Concrete Reinforcing
- .2      Section 03 30 00 – Cast in-Place Concrete
- .3      Section 07 92 10 – Joint Sealing

**1.2      MEASUREMENT FOR PAYMENT**

- .1      No measurement or payment will be made under this section. Include costs in items of work for which concrete formwork and falsework are required.

**1.3      REFERENCES**

- .1      Canadian Standards Association (CSA International)
  - .1      CSA-A23.1/A23.2, Concrete Materials and Methods of Concrete Construction/ Test Methods and Standard Practices for Concrete.
  - .2      CSA-O86, Engineering Design in Wood.
  - .3      CSA O121, Douglas Fir Plywood.
  - .4      CSA O151, Canadian Softwood Plywood.
  - .5      CSA O153, Poplar Plywood.
  - .6      CAN/CSA-O325.0, Construction Sheathing.
  - .7      CSA O437 Series, Standards for OSB and Waferboard.
  - .8      CSA S269.1, Falsework for Construction Purposes.
  - .9      CAN/CSA-S269.3-, Concrete Formwork, National Standard of Canada

**1.4      SUBMITTALS**

- .1      Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2      Submit shop drawings for formwork and falsework.
  - .1      Submit drawings stamped and signed by professional engineer registered or licensed in Provinces of Newfoundland & Labrador, Canada.
- .3      Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawing. Comply with CAN/CSA-S269.3 for formwork drawings.
- .4      Indicate formwork design data: permissible rate of concrete placement, and temperature of concrete, in forms.

- .5 Indicate sequence of erection and removal of formwork/falsework as directed by Departmental Representative.

## **1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 – Construction/Demolition Waste Management and Disposal and the Waste Reduction Workplan.
- .2 Place materials defined as hazardous or toxic waste in designated containers.
- .3 Ensure emptied containers are sealed and stored safely for disposal away from children.
- .4 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low VOC's.

## **PART 2      PRODUCTS**

### **2.1 MATERIALS**

- .1 Formwork materials:
  - .1 For concrete use wood and wood product formwork materials to CSA-O121 and CAN/CSA-O86.
- .2 Form ties:
  - .1 For concrete use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.
- .3 Form release agent:
  - .1 Chemically active release agents containing compounds that react with free lime in concrete to form a release film preventing concrete from sticking to forms; having no adverse affects on adhesives or other treatments, which are specified for application to concrete and containing no non-drying ingredients such as mineral oil.
  - .2 Use non-toxic, bio-degradable form release agent with low VOC content.
- .4 Falsework materials: to CSA-S269.1.
  - .1 Materials required to bear grade marks, or be accompanied with certificates, test reports or other proof of conformity.
- .5 Pre-moulded joint fillers:
  - .1 Bituminous impregnated fibreboard to ASTM D1751.
- .6 Bond Breaker:
  - .1 Impermeable tube formed of polyvinylchloride, rubber or similar material to the approval of the Departmental Representative. Internal diameter equal to dowels.

- .7 Sealant: to Section 07 92 10 – Joint Sealing.

### **PART 3**      **EXECUTION**

#### **3.1**            **FABRICATION AND ERECTION**

- .1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.
- .2 Fabricate and erect falsework in accordance with CSA S269.1.
- .3 Do not place shores and mud sills on frozen ground.
- .4 Provide site drainage to prevent washout of soil supporting mud sills and shores.
- .5 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1A23.2.
- .6 Align form joints and make watertight.
  - .1 Keep form joints to minimum.
- .7 Use 25 mm chamfer strips on external corners and/or 25 mm fillets at interior corners, joints, unless specified otherwise.
- .8 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .9 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.
  - .1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.
- .10 Clean formwork in accordance with CSA-A23.1 before placing concrete.

#### **3.2**            **REMOVAL AND RESHORING**

- .1 Leave formwork in place for following minimum periods of time after placing concrete.
  - .1 Seven (7) days for walls and sides of beams.
  - .2 Seven (7) days for columns.
  - .3 Fifteen (15) days for beam soffits, slabs, decks and other structural members, or seven (7) days when replaced immediately with adequate shoring to standard specified for falsework.
  - .4 Five (5) days for footings and abutments.
- .2 Remove formwork when concrete has reached 75% of its design strength or minimum period noted above, whichever comes later, and replace immediately with adequate re-shoring.

- .1 Provide concrete test results to the Departmental Representative for review prior to removing formwork.
- .3 Provide necessary re-shoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.
- .4 Space reshoring in each principle direction at not more than 3000 mm apart.
- .5 Re-use formwork and falsework subject to requirements of CSA-A23.1.

**3.3 JOINT FILLERS**

- .1 Locate and form expansion joints as indicated. Install joint filler in all joints.
- .2 Use 13mm thick joint filler to separate slab-on-grade and extend joint filler from bottom of slab to within 25mm of finished slab surfaces unless indicated otherwise.

**3.4 JOINT SEALANT**

- .1 Fill expansion and control joints with sealer as per manufacturer's instructions.

**3.5 CONSTRUCTION JOINTS**

- .1 Apply bonding agent to entire face of previously poured concrete prior to commencing adjacent pour.
- .2 Sawcut construction joints to a depth of 50mm from top of reinforced concrete or slab-on-grade and fill with sealer as per manufacturer's instructions. Construction joints to be located over underlying deck support in the concrete deck.

**END OF SECTION**